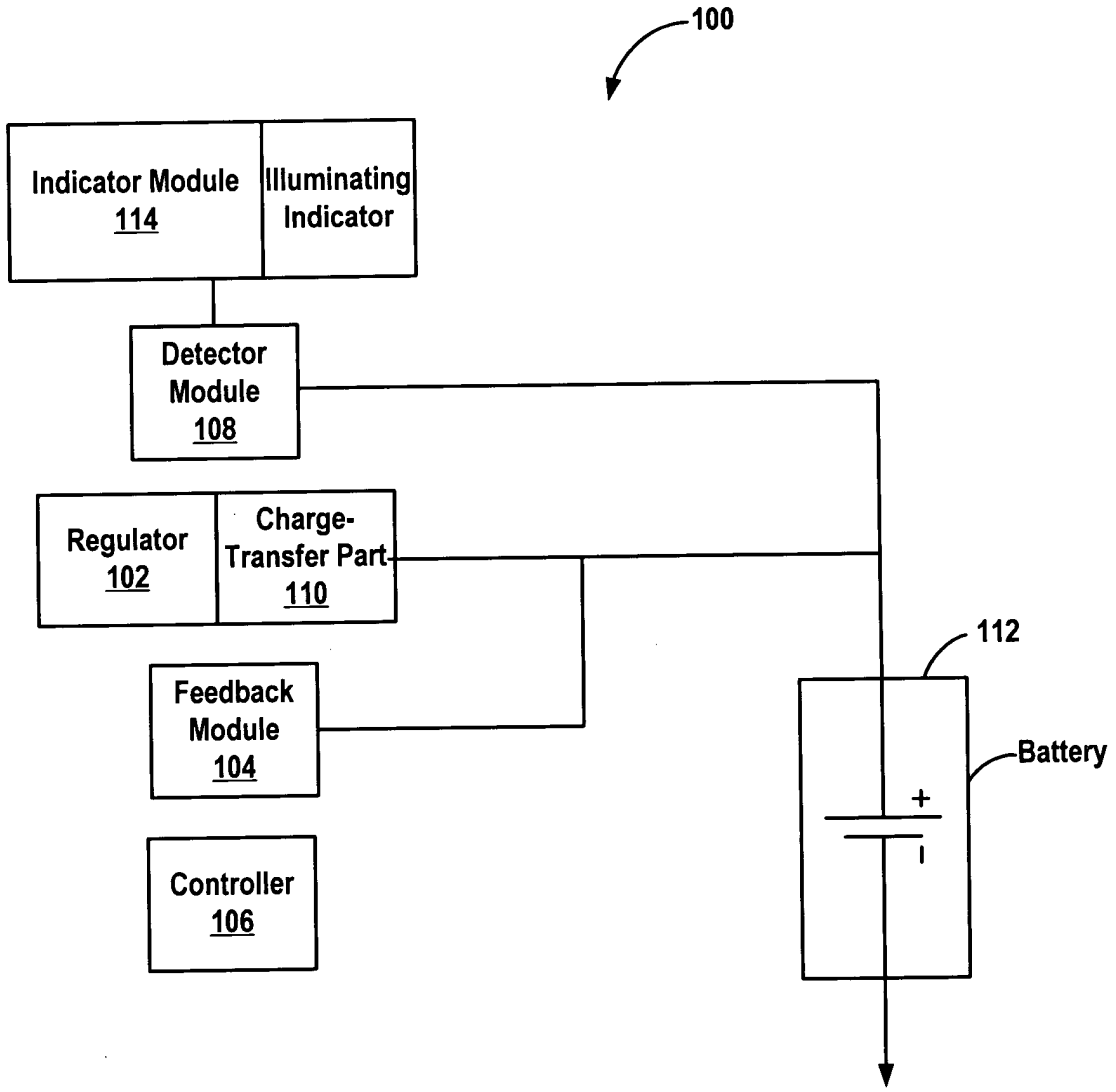
100
Indicator Module
114
Illuminating
Indicator
Detector
Module
108
Regulator
102
Charge-
Transfer Part
110
Feedback
Module
104
Controller
106
112
Battery
+
-

FIG. 1

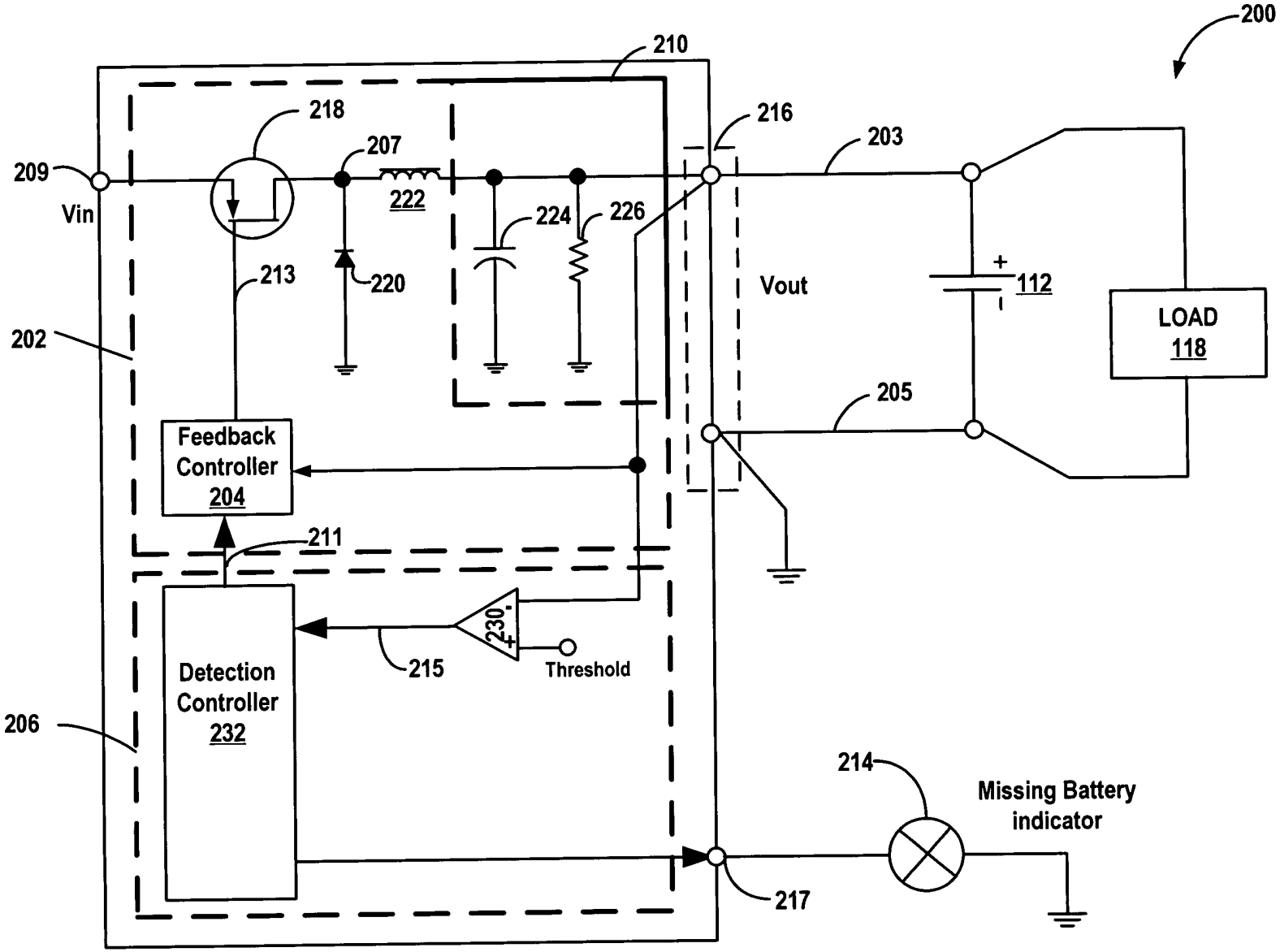
200
210
218
216
203
209
Vin
207
222
224
226
213
220
Vout
112
LOAD
118
202
205
Feedback
Controller
204
211
230
215
Threshold
Detection
Controller
232
206
214
Missing Battery
indicator
217

FIG. 2

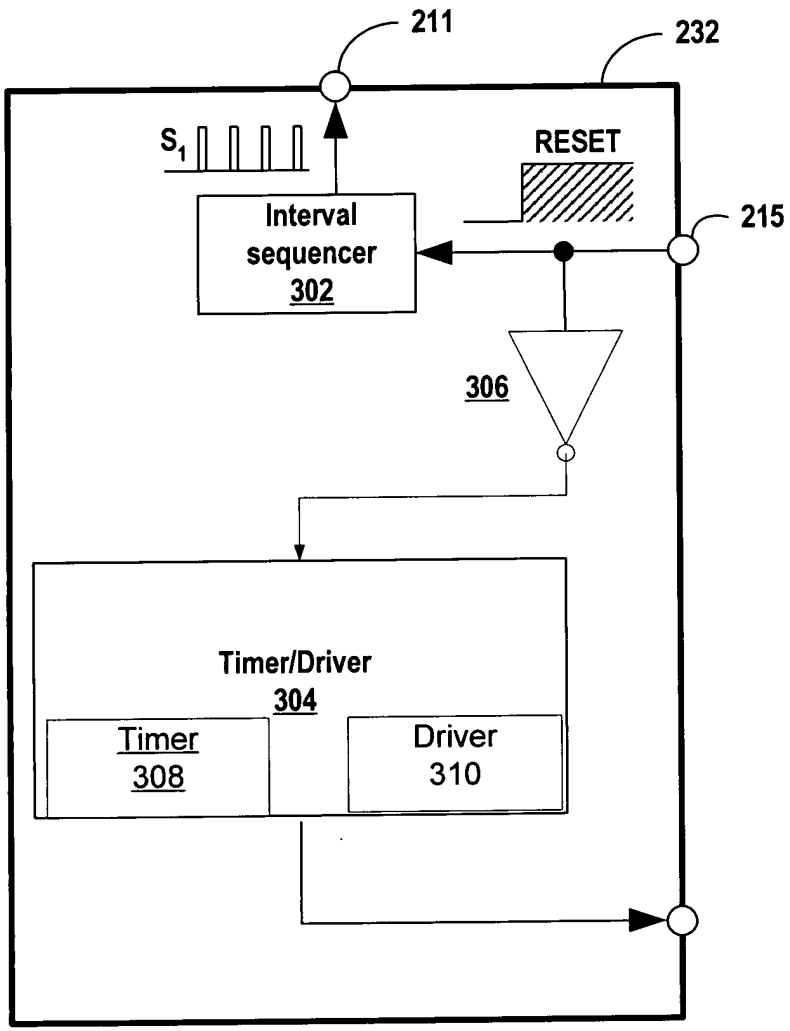
211
232
S_1
RESET
Interval sequencer 302
215
306
Timer/Driver 304
Timer 308
Driver 310

FIG. 3a

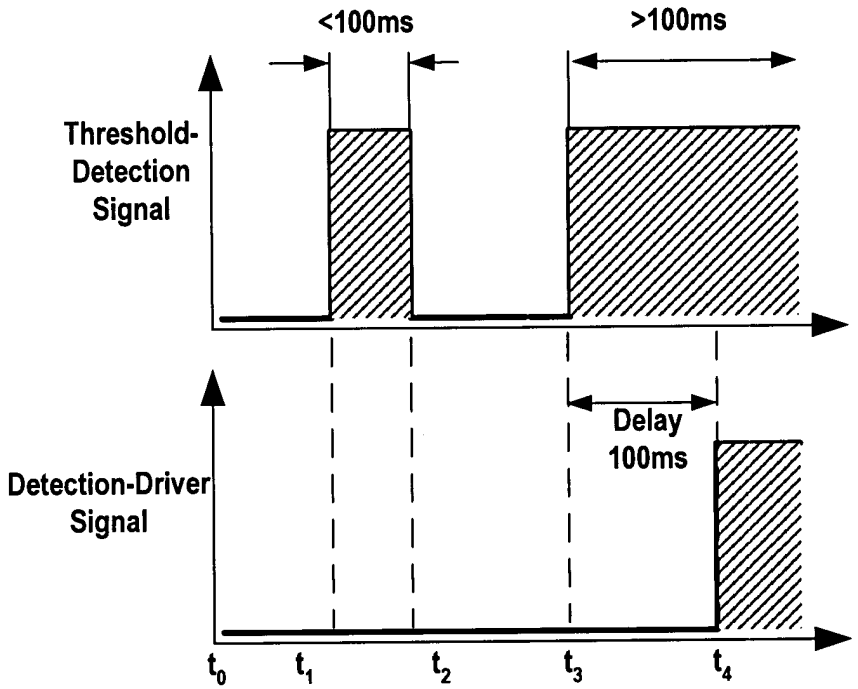
<100ms
>100ms
Threshold-Detection Signal
Delay 100ms
Detection-Driver Signal
t_0
t_1
t_2
t_3
t_4

FIG. 3b

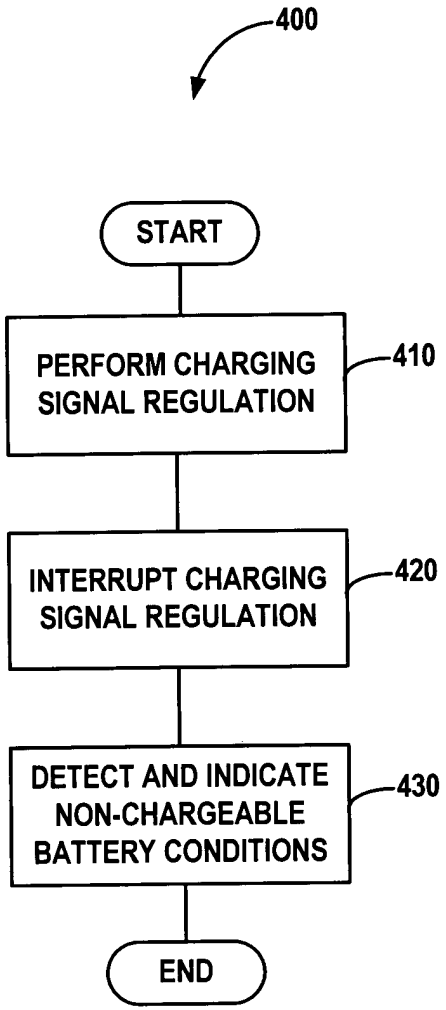
400
START
PERFORM CHARGING SIGNAL REGULATION
410
INTERRUPT CHARGING SIGNAL REGULATION
420
DETECT AND INDICATE NON-CHARGEABLE BATTERY CONDITIONS
430
END

FIG. 4

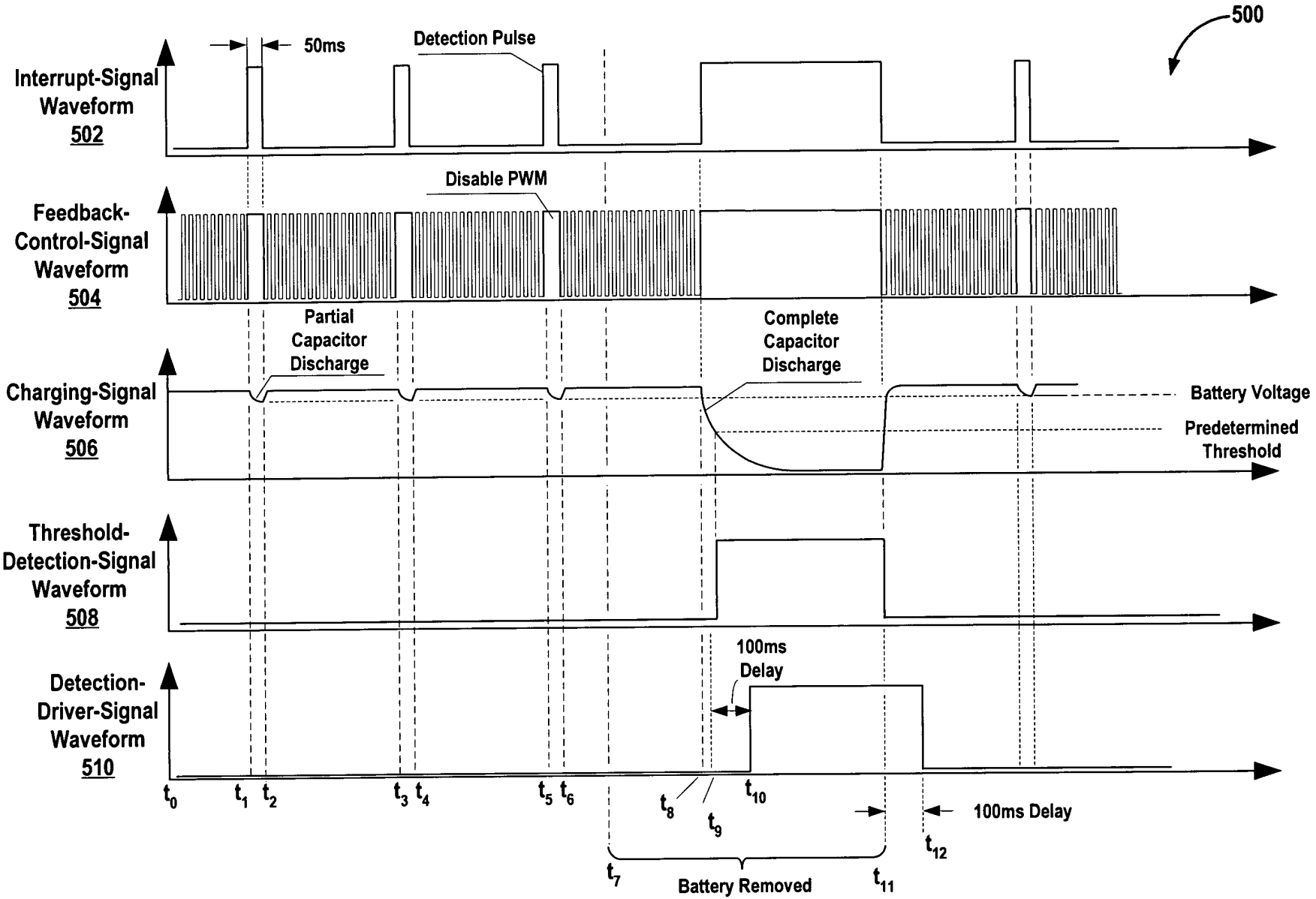
500
Interrupt-Signal Waveform 502
50ms
Detection Pulse
Disable PWM
Feedback-Control-Signal Waveform 504
Partial Capacitor Discharge
Complete Capacitor Discharge
Charging-Signal Waveform 506
Battery Voltage
Predetermined Threshold
Threshold-Detection-Signal Waveform 508
100ms Delay
Detection-Driver-Signal Waveform 510
t_0 t_1 t_2 t_3 t_4 t_5 t_6 t_7 t_8 t_9 t_{10} t_{11} t_{12}
100ms Delay
Battery Removed

FIG. 5